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The Attached Material is a [X] NEW [ ] REVISED Issuance of :

- [ ] DEPARTMENT ORGANIZATION MANUAL
- [ ] MANUAL OF ADMINISTRATIVE PROCEDURES
- [X] ~~REGIONAL ADMINISTRATIVE DIRECTIVES~~ MATERIALS METHODS

CODE NUMBER	DESCRIPTION
7.42-1-7.1	Source Approval and Shipment Procedures for Coarse and Fine Aggregates

PROC - 11a (1/68)

PROCEDURE

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Code 7.42-1-7.1 Date 12/1/72
Supersedes:

APPROVED: Director, Materials Bureau

SUBJECT: Materials Method N.Y. 7.1 SOURCE APPROVAL AND SHIPMENT PROCEDURES FOR COARSE AND FINE AGGREGATES

I. SCOPE

This Materials Method describes the qualifications and procedures for acceptance of aggregate sources, and subsequent verification of such acceptances, for use by New York State Department of Transportation Division of Design and Construction projects. Also, described are documentation and shipping procedures to be followed when shipping the approved aggregate to bituminous and portland cement concrete mix plants, supply locations or Department projects.

Detailed information on sampling procedure is found in Materials Method N.Y. 7.2, "SAMPLING METHODS AND PROCEDURES FOR COARSE AND FINE AGGREGATES."

Procedures necessary to check gradations at plants are described in Materials Method N.Y. 9, "INSPECTION AND TESTING FOR PORTLAND CEMENT CONCRETE" and Materials Method N.Y. 5, "PLANT INSPECTION OF BITUMINOUS CONCRETE."

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III. GENERAL METHOD

This Method encompasses a system of quality control and assurance of aggregates for use by the Department. The Department tests representative samples of processed aggregate from a source and recognizes that source's capability to produce aggregate in compliance with specification requirements for a defined period of time. This capability is also determined by supplemental information on each source in the form of Geological Reports and Quarry Reports, which are updated each year. Random petrographic samples are taken periodically by the Department to assure quality and consistency of the produced aggregates.

Also, described in this Method are the procedures for shipping accepted aggregate with appropriate accompanying documentation.

IV. DEFINITIONS

1. Department - The New York State Department of Transportation.

2. Materials Bureau - A facility of the Department, located in Albany, which may be contacted by mailing to:

   Harry H. McLean
   Director of Engineering Materials
   New York State Department of Transportation
   The State Campus - Bldg. # 7
   1220 Washington Avenue
   Albany, New York 12226

   or

   Telephoning the Product Control Office at:

   Area Code 518
   Phone Number 457-5642

   or

   T.W.X. to:

   710-441-88221
   N.Y.S. D.o.T., Albany Campus
   Materials Bureau, P.C.O.

3. Source - An operating location, or proposed location, from which aggregates may be shipped for eventual use by Department projects. There are three classifications of sources:

   a. Approved Source - A source which has been tested and approved by the Materials Bureau. The source, with its associated processing plant, must have supplied the Materials Bureau with an up-to-date Geological Report and, where required, Plant Flow Information. Unless otherwise authorized by the Materials Bureau, the source shall have a current test number (less than two years old) which has been issued by the Materials Bureau.

   b. Non-Approved Operating Source - A source having a functional processing plant and which is capable of supplying aggregate for Department use but has not received formal acceptance from the Materials Bureau. This same term is used to refer to a source which has been previously rejected by the Department.

   c. Proposed Unopened Source - A geographic location potentially capable of supplying acceptable raw material for processing into aggregate usable by the Department.

   For the purposes of this Materials Method, the term Source will be considered synonymus with Manufacturer, as that company or individual whose processing plant prepares raw materials to conform to the Department specifications for Aggregate.

4. Supplier - An individual or company involved in supplying approved aggregate for Department use. A supplier shall be responsible for obtaining aggregate from approved sources and maintaining the integrity of that aggregate by means of isolated and identifiable stock piles, at the supply location. The supplier shall also be required to see that all necessary documentation is received with aggregates arriving at the supply location, and that all shipments made from the supply location for Department use are accompanied by a DELIVERY TICKET as defined in this Materials Method.

5. Sample - Representative material from a stock pile or, when designated by the Materials Bureau, a special run-of-bank sample from sand or gravel sources. All samples must be taken by a representative of the Department and submitted to the Materials Bureau in accordance with the appropriate instructions in Materials Method N.Y. 7.2, "Sampling Methods and Procedures for Coarse and Fine Aggregates." All samples, except the special run-of-bank samples noted above, must be representative of the aggregates after processing; e.g., coarse aggregate shall be sampled after screening into sizes.

   a. Routine (Biennial or Information) samples will be taken whenever necessary according to the following criteria:

      (1) When the latest test for a source will be two years old upon the expected completion of testing and acceptance action on the samples.

      (2) When a change in the character of the processed aggregate occurs.

      (3) When the location of the source of raw material is shifted or a change in the character of the raw material occurs.

      (4) When considered necessary by the Department.

   b. Petrographic Samples of all types of aggregate, taken from sources supplying Department projects, shall be submitted to the Materials Bureau for Petrographic Examination. Frequency of such sampling will vary, depending upon the amount of production, past service records and previous tests, but, shall have a nominal rate of two samples for each size aggregate being supplied to Department projects during a construction season.

6. Forms - The following forms are published and issued by the Department for use by the Materials Bureau for Department related purposes.

a. BR-3, Aggregate Sample Information - This form, executed by the Department representative taking the sample, is transmitted with the sample to the Materials Bureau. The form should be made out in triplicate; one copy put inside the sample bag (enclosed in a waterproof envelope, BR-11, if the sample is wet), a second copy attached to the outside of the sample bag in an envelope (Form BR-241), and the third copy retained by the Inspector.

b. BR-241, Transmittal Envelope - This is a heavy-duty envelope used to contain Form BR-3.

c. BR-11, Waterproof Envelope - This is a heavy-duty, waterproof envelope used to contain Form BR-3.

7. Delivery Ticket - A form executed by a manufacturer or supplier, for aggregates delivered, stating the quantity, nominal sizes and source of the aggregates.

8. Regional Director - The individual, acting through the Commissioner, who is delegated the authority and responsibility to execute the total Department prescribed work plans for his respective Region.

9. Inspector - A representative of the Department, acting in behalf of the Regional Director, involved in executing the provisions of this Materials Method.

10. Deputy Chief Engineer - Deputy Chief Engineer (Technical Services) - A Deputy Chief Engineer as defined in Department specification.

11. Certification - A document, issued prior to the beginning of construction for any calendar year by each contractor or mixing plant intending to incorporate coarse or fine aggregates into Department work, certifying to the appropriate Regional Director that such aggregates are from approved sources. The certification shall include the Department test numbers of all aggregates physically present at the mixing plant or project available for use in Department work. This initial certification will also cover all additional supplies of aggregates so long as they are of the same test numbers and no new nominal aggregate sizes are introduced. When changes in test

number and/or the introduction of additional sizes occur, a new certification shall be executed describing all aggregates physically present for Department work including those represented by test numbers originally certified.

A copy of each certification shall be given to the Inspector at mixing plants off the project site and to the Engineer when the aggregates are located at the project. It shall be the responsibility of the mixing plant or contractor to identify by test number to the Inspector, upon request, any aggregate used in Department work.

12. Mixing Plant - A Portland Cement Concrete or Bituminous Concrete mixing or batching plant facility which incorporates aggregates into a mix to be used on Department work.

V. EVIDENCE OF ACCEPTABILITY

A. At the Source

A letter of notification from the Region Office stating the sizes and types of aggregates accepted and the test number(s) assigned by the Materials Bureau.

B. At a Mixing Plant or Project

(1) A material Certification letter from the source or supplier stating that the aggregates delivered to that mixing plant have been sampled and accepted by the Department and informing them of the test number(s) assigned.

(2) Periodic visual inspections by the plant inspector.

(3) Delivery tickets for the aggregate supplied directly to the project.

VI. STEPS IN PROCEDURE

PART "A" - Proposed Unopened Source
PART "B" - Non-Approved Operating Source
PART "C" - Routine Sampling of an Approved Source
PART "D" - Shipments

A. Proposed Unopened Source

Responsibility	Action
Source	1. Notifies Regional Director as to availability and location of proposed Source and requests sampling of same.
Regional Director	2. Evaluates necessity of proposed Source.
	3. Makes recommendation to the Deputy Chief Engineer for sampling.
Deputy Chief Engineer	4. Evaluates recommendation of Regional Director.
	5. If approved, instructs Regional Director to sample proposed Source.
	NOTE: Sampling may or may not, at the discretion of the Deputy Chief Engineer, be done under the auspices of a representative of the Materials Bureau, Main Office.
	NOTE: If NOT approved, by either the Regional Director or the Deputy Chief Engineer, the Regional Director shall so notify the Source in writing.
Regional Director	6. Designates an Inspector.
Inspector	7. Notifies Source that samples will be taken and schedules a time.
	8. Takes samples in accordance with the appropriate procedures in Materials Method N.Y. 7.2 or as directed by the representative of the Materials Bureau, Main Office.
	9. Makes out Form BR-3 and transmits with sample to the Materials Bureau.

Responsibility	Action
Materials Bureau	10. Conducts necessary tests and evaluates the potential quality of the material in the sample.
	11. Lists pertinent test result information on an appropriate Department test form.
	NOTE: Results of tests for quality on samples from a proposed Source are for INFORMATION ONLY and may not be construed as a Source approval for that Source.
	12. Sends completed test result form to the Region submitting the sample.
Inspector	13. Notifies the Source as to the test results on the sample.
	14. Instructs the Source of the procedures to be followed to become an Approved Source for supplying aggregate for Department use.

UPON COMPLETION OF THE ABOVE PROCEDURES, IT IS THE RESPONSIBILITY OF THE SOURCE TO COMMENCE OPERATIONS AND MANUFACTURE SUFFICIENT QUANTITIES OF FINISHED AGGREGATE TO MERIT COMPLETE TESTING FOR CONFORMANCE TO SPECIFICATION, BY THE MATERIALS BUREAU. AT SUCH TIME, PROCEDURES AS OUTLINED IN PART "B" HEREIN, APPROVAL PROCEDURES FOR "NON-APPROVED OPERATING SOURCE" MUST BE FOLLOWED.

B. Non-Approved Operating Source

Responsibility		Action
Source	1.	Notifies Regional Director as to availability and location of Source and requests sampling of same.
Regional Director	2.	Evaluates necessity of Source.
	3.	Makes recommendation to the Deputy Chief Engineer for sampling.
Deputy Chief Engineer	4.	Evaluates recommendation of Regional Director.
	5.	If approved, instructs Regional Director to sample the Source.
		NOTE: Sampling may or may not, at the discretion of the Deputy Chief Engineer, be done under the auspices of a representative of the Materials Bureau, Main Office.
Region Director	6.	Designates Inspector.
Inspector	7.	Notifies Source that samples will be taken and schedules a time.
	8.	Instructs Source to contact Materials Bureau for instructions on the preparation of Geological Report (Appendix No. 1 of this Materials Method) and Plant Flow Information Report (Appendix No. 2 of this Materials Method) to be presented to the Inspector at the time of sampling.
Source	9.	Contacts the Materials Bureau for specific information requirements of the Geological Report and Plant Flow Information Report.

Responsibility		Action
Source (cont'd)	10.	Prepares the necessary Reports in accordance with instructions from the Materials Bureau.
Inspector	11.	Arrives at the Source on the agreed sampling date.
	12.	Takes samples.
		NOTE: Samples will be taken in accordance with the appropriate procedures in Materials Method N.Y. 7.2 or as directed by the representative of the Materials Bureau, Main Office.
	13.	Receives Geological Reports and Plant Flow Information from the Source.
	14.	Transmits samples, with properly filled out copies of Form BR-3, and Reports to the Materials Bureau.
Materials Bureau	15.	Assigns test number and performs all necessary tests on the samples.
	16.	Analyzes and evaluates test results and submitted reports.
	17.	Takes acceptance or rejection action.
	18.	Sends pertinent test results and action to the Region submitting the samples.
		NOTE: For Acceptances Only - Action is issued to adjacent Regions who would normally be expected to receive aggregates from the Source.
Inspector	19.	Notifies the Source as to the action taken by the Materials Bureau and, if the source is accepted, gives them the test number assigned by the Materials Bureau.

Responsibility	Action
Source	20. Makes out material Certification letters and sends to all plants, storage locations or projects receiving shipments of aggregate for eventual use on Department projects.

UPON COMPLETION OF THE ABOVE PROCEDURES, THE SOURCE IS READY TO MAKE SHIPMENTS OF AGGREGATE FOR EVENTUAL USE BY THE DEPARTMENT. SHIPMENT PROCEDURE, AS OUTLINED IN PART "D" MUST BE FOLLOWED.

C. Routine Sampling of An Approved Source

Responsibility	Action
Inspector	1. Notifies source that the Department will sample his material. NOTE: Routine samples may be taken at any time and for any of the four reasons stated in the definition of the term Sample in this Materials Method.
	2. Arranges a time for the sampling.
	3. Arrives at the source at the pre-arranged time.
	4. Samples the aggregate in accordance with the provisions of Materials Method N.Y. 7.2.
	5. Transmits samples with properly filled out copies of Form BR-3 to the Materials Bureau.
Materials Bureau	6. Assigns test number and performs all necessary tests on the samples.
	7. Analyzes and evaluates test results and updated Reports.

Responsibility	Action
Materials Bureau (cont'd)	8. Takes acceptance or rejection action.
	9. Sends pertinent test results and action to the Region submitting the sample.
	NOTE: For Acceptances Only - Action is issued to adjacent Regions who would normally be expected to receive aggregates from the Source.
Inspector	10. Notifies the Source as to the action taken by the Materials Bureau and, if the Source is accepted, gives them the test number assigned by the Materials Bureau.
	11. Notifies all plants currently certified as using aggregates from that source, as to the change in test number for that source.
Source	12. Makes out material Certification letters and sends to all plants, storage locations or projects receiving shipments of aggregate for eventual use on Department project.

D. Shipments

Responsibility	Action
Source	1. Receives order for aggregates for use by a Department project, from a plant supplying a Department project, or an intermediate supplier.
	2. Determines if the consignee has received a materials certification letter for current year; if not, sends one. The letter should state that the aggregates to be delivered have been sampled and accepted by the Department and should contain the test number assigned.

Responsibility		Action
Source (cont'd)	3.	Prepares aggregate for shipment.
	4.	Makes out Delivery Ticket to accompany aggregate to shipping destination.
	5.	Makes shipment.
Plant, Project or Supplier	6.	Receives shipment with accompanying Delivery Ticket.
	7.	The shipment of aggregate received is stockpiled in such a manner that it is isolated and identifiable.
Plant or Project ONLY	8.	Retains all Delivery Tickets pertaining to aggregates used on Department projects and makes these available to the Department upon request.
Supply Location ONLY	9.	Makes shipments of aggregates to plants or Department projects with accompanying Delivery Tickets, including both the source and the supplier.

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APPENDIX NO. I

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

GEOLOGICAL REPORT REQUIREMENTS FOR SAND AND GRAVEL OPERATIONS

To more fully evaluate and ensure the quality of all material produced from granular deposits, a Geological Source Report shall be submitted from each sand and gravel operation furnishing material to New York State Department of Transportation contracts. The report shall be prepared by a qualified geologist. This person should contact the Materials Bureau of the New York State Department of Transportation for specific information on the report requirements.

The report shall be submitted annually before the beginning of the year's operations. The information in the report shall cover a minimum of one year's proposed operations. In preparing the annual report, it shall not be necessary to resubmit any information which has been submitted in the initial geologic report. The annual reports shall include a revised map and cross-sections which show the changes in faces and the area of proposed operations. Any new geologic information which has become available during the year shall also be included.

The following information is offered for the aid of geologists and company personnel preparing the reports:

A. The body of the report shall include:

1. The property owners' name and address.

2. The lessees' name and address.

3. A description of the area of operations and method of operating the deposit.

4. The mode of deposition of the unconsolidated material (Kame, Esker, Delta, Outwash, etc.). The glacial history of the deposit shall be presented in enough detail to indicate the relationship of the deposit to other glacial deposits in its immediate area. The surficial geology shall be indicated either on the location map or the property map, depending upon which scale is necessary to present the information in a meaningful manner.

5. The agricultural soil type associated with the deposit and the source of soil type designation.

B. Location Map

The location of the plant and all deposits proposed for use during the coming year shall be indicated on either a 15 minute or 7½ minute U.S.G.S. topographic map. The entire quadrangle map may be folded, placed in a pocket and submitted with the report or the portion of the map containing the required locations may be cut out and submitted as a page of the report. A good photocopy of the portion of the map is also acceptable.

C. The Source Map for each deposit shall show:

1. A permanently established and marked base line that will not be disturbed by foreseeable future operations. It should be close enough to the source so that all features can be conveniently and accurately referred to it by standard survey methods.

2. A permanently established bench mark. Elevation need not be elevation above sea level, but if an empirical elevation is used, avoid negative values.

3. Use scale appropriate to size of property or proposed source area. 1" = 50' or 100' is preferred. Other scales may be used if, in the judgement of the person preparing the report, they are adequate to show the important features of the deposit.

4. Elevations to be shown by means of contour lines with the contour interval not greater than 10 feet. The mined-out area need not be contoured. Spot elevations along the toe and crest of the faces shall be required.

5. An outline of the proposed operating area including the location of all working faces and lifts.

6. The base map may be prepared by photogrammetric surveys, transit and stadia, plane table, or by an enlargement of a 7½ minute U.S.G.S. topographic map showing the entire property area.

   If the U.S.G.S. contour maps are used to make the base map, the following requirements must be met:

   a. The bench mark or established base line must conform to the U.S.G.S. datum.

b. The portion of the map showing the proposed area of operations must be revised using transit and stadia or plane table methods.

c. The map must conform to the existing topography.

7. The base map may be revised for any number of succeeding annual reports by indicating the area estimated for each season's operations and revising elevations and contours in working areas.

8. Lines of geologic cross-sections.

9. True or magnetic north; indicate which.

10. Approximate date of survey.

11. The locations of any drill holes or test pits.

12. The location of sampling for petrographic analysis.

13. The location of any springs or standing ponds indicating water table level.

14. If undesirable material exists in the vicinity of the proposed operations, then the area of this material shall be indicated on the map and outlined by stakes. The stakes shall be of sufficient height and painted, flagged or otherwise plainly marked so that there is unobstructed visibility between any two adjacent stakes.

D. Geologic Cross-Sections

One or more cross-sections of the deposit shall be submitted which show the lifts and operating faces. The cross-sections shall indicate:

1. The depth and type of overburden.

2. Depth of weathered zone.

3. The position of the ground water table and bedrock when encountered.

4. Attitude of bedding, where reasonable, of the unconsolidated material.

5. The locations of any drill holes, test pits and points of sampling for petrographic analysis, if encountered in cross-sections.

6. The location and thickness of major lenses of sand, gravel and silt.

7. Area of proposed operation for the coming season.

8. Elevations along the sides of the section.

E. Petrographic Analysis

The petrographic analysis shall be completed in conformance with with ASTM - C-295.

1. Current Operations - In the case of operating sources, representative samples of gravel (plus 1/4 inch material) should be obtained at the plant before crushing or from the existing faces of the deposit. Each operating deposit must be represented by a petrographic sample. Wehn more than one mode of deposition is represented within one area of proposed operation, at least one petrographic sample shall be required for each type of deposit.

2. Proposed Source Locations - Propoased locations not having an opened face must be evaluated individually to determine the best method of sampling.

To prepare the petrographic sample separations shall be made on the following screens and a determination of the percentages of the different rock types present in each size fraction shall be made:

GRAVEL

Passing	Size Fraction Retained	Field Sample *(lbs.)	Test Sample (Particles)
	4"	150	300
4"	2"	150	300
2"	1"	90	300
1"	½"	50	300
½"	¼"	20	300

*Minimum sample weight (ASTM D-75)

The following sand sizes shall also be subjected to petrographic examination:

Sand Size	Particles
#4	300
#8	300
#16	300
#30	300
#50	300
#100	300

F. Additional Requirements

1. The approximate percentages of gravel, sand and silt shall be determined from the production records and visual observations of the operating faces.

2. If a deposit is determined to be highly variable in rock type composition by the person preparing the report, he should consult with the Materials Bureau of the Department of Transportation regarding the necessity for and number of drill holes and test pits to determine the extent of the variation.

APPENDIX NO. II

PLANT FLOW INFORMATION

Each operating source furnishing sand or gravel shall supply the following general Plant Flow Information:

1. Name and location of plant.

2. Name and location of all sources supplying material to plant and type of material to be supplied from each source; sand gravel, crushed stone screenings, etc.

3. Approximate plant capacity under normal operating conditions.

4. A summary of materials to be processed at the plant.

5. The approximate tonnage of processed items which are stockpiled for possible Departmental use during the coming year.

6. A Plant Flow Diagram which indicates in a general manner the normal flow processed for Departmental use of material through the plant. This diagram should include all equipment and should be keyed to a written description of each piece of equipment.

   The written description shall include:

   a. Size and type of equipment.

   b. Manufacturer.

   c. Size and type of screen opening.

   d. Points of separation of processed items.

   e. Points of washing, wetting, scrubbing, etc.

   f. If a wetting agent is used to control dust, the agent in use and points of application.

   g. Whether screenings are normally blended with the natural sand.

7. It is recognized that plant operations must change to accommodate the material feeding the plant and the product being produced. Therefore, this diagram shall not be construed by the Department to mean that the Producer cannot change his operations to meet his daily needs. The Department, however, shall be notified of major additions or deletions which may affect the finished product. This notification should be made at the time of additions or deletions to the plant.

The above required plant information is for use only by the Materials Bureau to evaluate the finished product and is not a criteria for acceptance and/or the rejection of the material.

APPENDIX NO. III

NEW YORK STATE DEPARTMENT OF TRANSPORTATION
QUARRY REPORT REQUIREMENTS

To more fully evaluate and ensure the quality of all crushed stone produced for New York State Department of Transportation contracts, each operating source furnishing material for these contracts shall submit a Quarry Report to the Department. The report shall be prepared by a qualified geologist and shall describe the characteristics and uniformity of the rock to be quarried during the coming year. The geologist should contact the Materials Bureau of the New York State Department of Transportation for specific information on the report requirements. A report shall be submitted annually before the beginning of the year's operations. The information in the report shall cover a minimum of one year's proposed operations. Approval of this report does not relieve the supplier of his responsibility to provide a uniform and acceptable product.

The following information is offered for the aid of geologists and company personnel preparing the reports:

A. The body of the report shall include:

1. The property owner's name and address.
2. The lessees' name and address.
3. A description of the formations and members to be quarried.
4. A description of any prominent beds which may be used as marker horizons.

B. Location Map

The location of the plant and the deposit shall be indicated on either a 15 minute or 7½ minute U.S.G.S. topographic map. The entire quadrangle map may be folded, placed in a pocket and submitted with the report or the portion of the map containing the required locations may be cut out and submitted as a page of the report. A good photocopy of the portion of the map is also acceptable.

C. The Quarry Map for each deposit shall show:

1. A permanently established and marked base line that will not be disturbed by foreseeable future operations. It should be close enough to the source so that all features can be conveniently and accurately referred to it by standard survey methods.

2. A permanently established bench mark. Elevation need not be elevation above sea level, but if an empirical elevation is used, avoid negative values.

3. Use scale appropriate to size of property or proposed source area. 1" = 50' or 100' is preferred. Other scales may be used if, in the judgement of the person preparing the report, they are adequate to show the important features of the deposit.

4. Elevations shall be shown by means of contour lines with the contour interval not grater than 5'. The mined-out area need not be contoured. Spot elevations along the toe and crest of the faces shall be required.

5. The lines of geologic-cross sections.

6. True or magnetic north (indicate which).

7. Date of survey.

8. An outline of the proposed operating area including the location of all working faces and lifts.

9. The proposed area of any selective quarrying must be indicated in a manner distinct from that of the other proposed operations. The reason for the selective operations shall be indicated in the report.

10. The base map may be revised for any number of succeeding annual reports by indicating the area estimated for each season's operations and revising elevations and contours in working areas. It shall not be necessary to remove the locations of working faces for previous years from the map or cross sections. The location of each face must be identified by date, if the face is not removed from the revised map or cross sections.

11. The base map may be prepared by photogrammetric surveys, transit and stadia or plane table surveys.

D. Geologic Cross-Sections

1. A minimum of two cross-sections is required. In horizontal strata, the two shall be approximately at right angles. In folded strata, one shall be normal to the strike and one parallel to the strike.

2. The sections shall be aligned to include the face of the quarry and at least one drill hole.

3. The cross-sections shall be drawn to scale showing the area of proposed operations for the coming year, the elevations of all operating levels, and the thickness and extent of all rock formations.

4. Elevations shall be indicated along the sides of the sections.

E. Drill Holes

1. The location of all drill holes will be surveyed and shown on the map, and on the gologic cross-sections.

2. The number of drill holes shall be determined on the basis of geologically expected continuity of rock quality and structure. At least two drill holes shall be required for each year's operation.

3. All holes shall penetrate at least to the proposed quarry floor elevation, and preferably 5 feet below.

4. In stratified, or layered rock, drill holes should intersect all strata, or layers that will be quarried. Holes may be vertical, horizontal or at any other angle in order to meet this requirement.

5. Size "NX" (2 1/8 inch diameter) cores are highly recommended. Experience indicates that maximum recovery is necessary and this can be better accomplished with larger cores.

6. The size of the area explored by drill holes need not be confined to one year's operations, but may include any desired area for any reasonable number of annual operations. If in the opinion of the geologist, the structural and stratigraphic continuity of the rock permits, the drill holes may be located up to 1000 feet from the current faces.

7. New cores shall be taken whenever the proposed area of quarrying extends beyond that area covered by existing cores. Specific examples would be a depth below existing cores or an area more than 250 feet beyond existing drill holes.

8. All rock cores shall be retained by the operator and shall be made available to the Department for examination. The cores shall be stored where they are reasonably protected from the weather. They shall not be discarded, as they may be required to resolve future problems in quarrying.

F. Logging of Cores

1. Cores shall be split in order to show the fractured surface.

2. Logs shall be presented graphically as columnar sections at such a scale that all pertinent features and variations in quality can be described next to the section.

3. The logs shall show elevation and/or depth from surface.

4. The logs shall show basic geologic information such as rock type, grain size, degree of weathering, and geologic formation.

G. Subsequent Annual Reports

1. It shall not be necessary to resubmit any information which has been submitted in the initial geologic report.

2. The map and cross sections shall be revised to show any changes in the faces and area of proposed operations.

3. Any new geologic information which has become available during the year shall be included.

4. Any change in ownership shall be indicated.

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